

### CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

- 1           1.       A system for robust transmission delimiting, comprising:
- 2               a communication message including a preamble, the preamble including a
- 3               plurality of bits representing communication link control information; and
- 4               an encoder configured to encode the preamble bits into a plurality of symbol
- 5               indices, the symbol indices encoded at a lower bit per symbol rate relative to the
- 6               maximum rate capable of being supported over a communication channel.
- 1           2.       The system as defined in claim 1, further comprising a gain boost element
- 2               configured to increase the energy of the first symbol index to reliably indicate the
- 3               beginning of the communication message.
- 1           3.       The system as defined in claim 2, wherein the energy of the first symbol
- 2               index is increased by 3 dB.
- 1           4.       The system as defined in claim 1, wherein the preamble includes
- 2               information that defines a rate at which data following the preamble has been encoded for
- 3               transmission.

1           5.       The system as defined in claim 1, wherein the preamble includes  
2 information defining a maximum rate at which a transceiver that is sending the preamble  
3 is able to receive transmissions from a transceiver that is receiving the preamble.

1           6.       The system as defined in claim 1, wherein the preamble indicates whether  
2 a data portion follows the preamble and, if so, the format and type of data that follows the  
3 preamble.

1           7.       The system as defined in claim 1, wherein the preamble indicates whether  
2 administrative information follows the preamble.

1           8.       The system as defined in claim 6, further comprising:  
2 a first scrambler configured to scramble the preamble; and  
3 a second scrambler configured to scramble the data.

1           9.       The system as defined in claim 8, in which a state of the scrambler used to  
2 scramble the bits that comprise the preamble is the state that existed when scrambling of  
3 a previous preamble was completed.

1           10.     The system as defined in claim 6, wherein the data portion of the  
2     communication message comprises fixed size units, the fixed size units comprising a  
3     plurality of bits and

4                 wherein the bits are encoded into symbol indices such that, for each of the fixed  
5     size units, one symbol index is encoded differently from the other symbols.

1           11.     The system as defined in claim 10, wherein the differently encoded symbol  
2     index further comprises an extra bit that indicates whether the fixed size unit from which  
3     the other bits of the differently encoded symbol indices are obtained is the last one  
4     transmitted in a message.

1           12.     The system as defined in claim 10, wherein the differently encoded symbol  
2     index is encoded at a data rate lower than that of the other symbols carrying message data.

1           13.     A system for delimiting the end of a transmission, comprising:  
2                 a communication message segmented into a plurality of fixed size units, each  
3     fixed size unit including a plurality of bits; and  
4                 an encoder configured to encode the plurality of bits into a plurality of symbol  
5     indices at a first data rate, the encoder also configured to encode the first symbol index  
6     containing only bits from each fixed size unit at a data rate lower than that of the first data  
7     rate.

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1 14. A method for robust transmission delimiting, the method comprising the  
2 steps of:

3 applying a preamble to a communication message, the preamble including a  
4 plurality of bits representing communication link control information; and

5 encoding the preamble bits into a plurality of symbol indices, the symbol indices  
6 encoded at a lower bit per symbol rate relative to the maximum rate capable of being  
7 transmitted over a communication channel.

1 15. The method as defined in claim 14, further comprising the step of  
2 increasing the energy of the first symbol index to reliably indicate the beginning of the  
3 communication message.

1 16. The method as defined in claim 14, further comprising the step of  
2 increasing the energy of the first symbol index by 3 dB.

1 17. The method as defined in claim 14, further comprising the step of  
2 including information in the preamble defining a rate at which data following the  
3 preamble has been encoded for transmission.

1 18. The method as defined in claim 14, further comprising the step of  
2 including information in the preamble defining a maximum rate at which a transceiver  
3 that is sending the preamble is able to receive transmissions from a transceiver that is  
4 receiving the preamble.

1           19.     The method as defined in claim 14, further comprising the step of using  
2     the preamble to indicate whether a data portion follows the preamble and, if so, the  
3     format and type of data that follows the preamble.

1           20.     The method as defined in claim 14, further comprising the step of using  
2     the preamble to indicate whether administrative information follows the preamble.

1           21.     The method as defined in claim 19, further comprising the steps of:  
2     scrambling the preamble using a first scrambler; and  
3     scrambling the data using a second scrambler.

1           22.     The method as defined in claim 21, further comprising the step of  
2     scrambling the bits in the preamble using the state of the scrambler that existed when  
3     scrambling of the previous preamble was complete.

1           23.     The method as defined in claim 19, wherein the data portion of the  
2     communication message comprises fixed size units, the fixed size units comprising a  
3     plurality of bits ; and

4                     wherein the bits that comprise each of the fixed size units are encoded into  
5     symbol indices such that for each of the fixed size units, one symbol index is encoded  
6     differently from the other symbols.

1           24.     The method as defined in claim 23, further comprising the step of  
2 including in said differently encoded symbol index an extra bit that indicates whether the  
3 fixed size unit from which the other bits of said differently encoded symbol indices are  
4 obtained is the last one transmitted in a message.

1           25.     The method as defined in claim 23, further comprising the step of  
2 encoding the differently encoded symbol index at a data rate lower than that of the other  
3 symbols carrying message data.

1           26.     A method for delimiting the end of a transmission, the method comprising  
2 the steps of:  
3           segmenting a communication message into a plurality of fixed size units, each  
4 unit including a plurality of bits;  
5           encoding a plurality of the bits in the cells into a plurality of symbol indices, the  
6 symbol indices being encoded at a first rate; and  
7           encoding the first symbol index containing only bits from each fixed size unit at a  
8 rate lower than that of the first rate.

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1           27.    A system for robust transmission delimiting, comprising:  
2                   means for applying a preamble to a communication message, the preamble  
3 including a plurality of bits representing communication link control information; and  
4                   means for encoding the preamble bits into a plurality of symbol indices, the  
5 symbol indices encoded at a lower bit per symbol rate relative to the maximum rate  
6 capable of being transmitted over a communication channel.

1           28.    The system as defined in claim 27, further comprising means for  
2 increasing the energy of the first symbol index to reliably indicate the beginning of the  
3 communication message.

1           29.    The system as defined in claim 27, further comprising means for  
2 increasing the energy of the first symbol index by 3 dB.

1           30.    The system as defined in claim 27, further comprising means for including  
2 information in the preamble defining a rate at which data following the preamble has  
3 been encoded for transmission.

1           31.    The system as defined in claim 27, further comprising means for including  
2 information in the preamble defining a maximum rate at which a transceiver that is  
3 sending the preamble is able to receive transmissions from a transceiver that is receiving  
4 the preamble.

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1           32.     The system as defined in claim 27, further comprising means for using the  
2     preamble to indicate whether a data portion follows the preamble and, if so, the format  
3     and type of data that follows the preamble.

1           33.     The system as defined in claim 27, further comprising means for using the  
2     preamble to indicate whether administrative information follows the preamble.

1           34.     The system as defined in claim 32, further comprising:  
2                 means for scrambling the preamble using a first scrambler; and  
3                 means for scrambling the data using a second scrambler.

1           35.     The system as defined in claim 34, further comprising means for  
2     scrambling the bits in the preamble using the state of the scrambler that existed when  
3     scrambling of the previous preamble was complete.

1           36.     The system as defined in claim 32, wherein the data portion of the  
2     communication message comprises fixed size units, the fixed size units comprising a  
3     plurality of bits; and  
4                 means for encoding the bits that comprise each of the fixed size units into symbol  
5     indices such that for each of the fixed size units, one symbol index is encoded differently  
6     from the other symbols.

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1           37.     The system as defined in claim 36, further comprising means for including  
2     in said differently encoded symbol index an extra bit that indicates whether the fixed size  
3     unit from which the other bits of said differently encoded symbol indices are obtained is  
4     the last one transmitted in a message

1           38.     The system as defined in claim 36, further comprising means for encoding  
2     the differently encoded symbol index at a data rate lower than that of the other symbols  
3     carrying message data.

1           39.     A system for delimiting the end of a transmission, comprising:  
2                 means for segmenting a communication message into a plurality of fixed size  
3     units, each unit including a plurality of bits;  
4                 means for encoding a plurality of the bits in (the cells) into a plurality of symbol  
5     indices, the symbol indices being encoded at a first rate; and  
6                 means for encoding (the first symbol index) containing only bits from each fixed  
7     size unit at a rate lower than that of the first rate.

1           40.    A computer readable medium having a program for robust transmission  
2    delimiting, the program comprising logic for performing the steps of:  
3           applying a preamble to a communication message, the preamble including a  
4    plurality of bits representing communication link control information; and  
5           encoding the preamble bits into a plurality of symbol indices, the symbol indices  
6    encoded at a lower bit per symbol rate relative to the maximum rate capable of being  
7    transmitted over a communication channel.

1           41.    The program as defined in claim 40, further comprising logic for  
2    performing the step of increasing the energy of the first symbol index to reliably indicate  
3    the beginning of the communication message.

1           42.    The program as defined in claim 40, further comprising logic for  
2    performing the step of increasing the energy of the first symbol index by 3 dB.

1           43.    The program as defined in claim 40, further comprising logic for  
2    performing the step of including information in the preamble defining a rate at which data  
3    following the preamble has been encoded for transmission.

1           44.    The program as defined in claim 40, further comprising logic for  
2    performing the step of including information in the preamble defining a maximum rate at  
3    which a transceiver that is sending the preamble is able to receive transmissions from a  
4    transceiver that is receiving the preamble.

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1           45.     The program as defined in claim 40, further comprising logic for  
2 performing the step of using the preamble to indicate whether a data portion follows the  
3 preamble and, if so, the format and type of data that follows the preamble.

1           46.     The program as defined in claim 40, further comprising logic for  
2 performing the step of using the preamble to indicate whether administrative information  
3 follows the preamble.

1           47.     The program as defined in claim 45, further comprising logic for  
2 performing the steps of:  
3                 scrambling the preamble using a first scrambler; and  
4                 scrambling the data using a second scrambler.

1           48.     The program as defined in claim 47, further comprising logic for  
2 performing the step of scrambling the bits in the preamble using the state of the scrambler  
3 that existed when scrambling of the previous preamble was complete.

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1           49.    The program as defined in claim 45, wherein the data portion of the  
2   communication message comprises fixed size units, the fixed size units comprising a  
3   plurality of bits; and  
4           wherein the bits that comprise each of the fixed size units are encoded into symbol  
5   indices such that for each of the fixed size units, one symbol index is encoded differently  
6   from the other symbols.

1           50.    The program as defined in claim 49, further comprising logic for  
2   performing the step of including in said differently encoded symbol index an extra bit that  
3   indicates whether the fixed size unit from which the other bits of said differently encoded  
4   symbol indices are obtained is the last one transmitted in a message.

1           51.    The program as defined in claim 49, further comprising logic for  
2   performing the step of encoding the differently encoded symbol index at a data rate lower  
3   than that of the other symbols carrying message data.

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- 1           52.     A computer readable medium having a program for delimiting the end of a
- 2     transmission, the program comprising logic to perform the steps of:
- 3           segmenting a communication message into a plurality of fixed size units, each
- 4     unit including a plurality of bits;
- 5           encoding a plurality of the bits in the cells into a plurality of symbol indices, the
- 6     symbol indices being encoded at a first rate; and
- 7           encoding the first symbol index containing only bits from each fixed size unit at a
- 8     rate lower than that of the first rate.

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